

**AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions and listings of claims in the Application. No new matter is introduced by way of the claim amendments. Current additions to the claims are noted with underlined text. Current deletions from the claims are indicated by text ~~striking through~~. The status of each claim is indicated in parenthetical expression following the claim number.

WHAT IS CLAIMED IS:

1 – 35. (Cancelled)

36. (Currently Amended) A product made by the process comprising:

- (a) selecting a plurality of carbon nanotubes; and
- (b) reacting the plurality of carbon nanotubes with an aryl diazonium specie to form ~~derivatized~~ carbon nanotubes derivatized with an aryl moiety, wherein reacting comprises bonding said aryl moiety to the carbon nanotube surface carbon atoms, wherein there is at least about one aryl moiety to forty carbon atoms on the carbon nanotube surface~~comprises reaction at the carbon nanotube sidewalls at non-defect sites.~~

37. (Previously Presented) The product of claim 36 further comprising dispersing the derivatized carbon nanotubes in a solvent.

38. (Currently Amended) A product made by the process comprising:

- (a) selecting an assembly of single-wall carbon nanotubes;
- (b) immersing the assembly in a solution comprising an aryl diazonium specie; and
- (c) applying a potential to the assembly to electrochemically react the assembly with the aryl diazonium specie, wherein electrochemically reacting comprises bonding an aryl moiety to the carbon nanotube surface carbon atoms, wherein there is at least about one aryl moiety to forty carbon atoms on the carbon nanotube surface~~comprises reaction at the carbon nanotube sidewalls at non-defect sites.~~

39. (Currently Amended) The product of claim 36 further comprising pre-forming an aryl diazonium species.
40. (Currently Amended) The product of claim 36 further comprising:
  - (c) mixing a precursor of the aryl diazonium specie with the plurality of ~~single-wall~~ carbon nanotubes; and
  - (d) generating the aryl diazonium specie, wherein the plurality of carbon nanotubes comprise is a plurality of single-wall carbon nanotubes.
41. (Previously Presented) The product of claim 36, wherein the plurality of carbon nanotubes comprise single-wall carbon nanotubes.
42. (Previously Presented) The product of claim 41, wherein the single-wall carbon nanotubes have an average diameter of at most about 0.7 nm.
43. (Currently Amended) The product of claim 36, wherein the plurality of carbon nanotubes are electrochemically reacted with the aryl diazonium specie.
44. (Currently Amended) The product of claim 36, wherein the plurality of carbon nanotubes are thermally reacted with the aryl diazonium specie.
45. (Previously Amended) The product of claim 36, wherein the aryl diazonium specie is generated *in situ*.
46. (Previously Amended) The product of claim 36, wherein the aryl diazonium specie is preformed before the plurality of carbon nanotubes are thermally reacted with the aryl diazonium specie.
47. (Previously Amended) The product of claim 36, wherein the plurality of carbon nanotubes are photochemically reacted with the aryl diazonium specie.
- 48 – 49. Cancelled.

50. (Previously Amended) The product of claim 36, wherein the plurality of carbon nanotubes is an assembly of carbon nanotubes.
51. (Currently Amended) The product of claim ~~36~~ 50, wherein the assembly is selected from the group consisting of a bucky paper and a mat.
52. (Previously Amended) The product of claim 50 further made by the process comprising:
  - (a) immersing the assembly in a solution comprising the aryl diazonium specie; and
  - (b) applying a potential to the assembly.
53. (Previously Presented) The product of claim 52, wherein the potential is a negative potential.
54. (Previously Presented) The product of claim 52, wherein the solution further comprises a supporting electrolyte specie.
55. (Previously Presented) The product of claim 52, wherein the step of applying a potential to the assembly comprises holding the assembly with an alligator clip treated with a colloidal silver paste.
- 56 – 57. Cancelled.
58. (Previously Presented) The product of claim 36, further made by the process comprising sonicating the derivatized carbon nanotubes.
59. (Cancelled) ~~The product of claim 36, wherein the amount of a moiety bonded to the carbon atoms of a carbon nanotube is at a moiety to carbon ratio at least about one moiety to forty carbon atoms.~~
60. (Currently Amended) The product of claim 36 or 38, wherein there is at least about one aryl moiety to thirty carbon atoms on the carbon nanotube surface ~~the amount of a moiety bonded to the carbon atoms of a carbon nanotube is at a moiety to carbon ratio at least about one moiety to thirty carbon atoms.~~

61. (Previously Presented) The product of claim 36, wherein the reaction is a thermal reaction at a temperature of at most about 200° C.
62. (Previously Presented) The product of claim 36, wherein the reaction is a thermal reaction at a temperature of at most about 60° C.
63. (Currently Amended) The product of claim 36 or 38 further comprising removing aryl ~~functional~~ moieties from the derivatized carbon nanotubes.
64. (Previously Amended) The product of claim 36 further comprising photochemically treating the mixture of the plurality of carbon nanotubes and the aryl diazonium specie.
65. (Previously Presented) The product of claim 64, wherein the photochemical treatment comprises the use of an ultraviolet light source.
66. (Previously Presented) The product of claim 64, wherein the photochemical treatment comprises the use of a visible light source.
67. (Previously Amended) The product of claim 40, wherein the precursor of the aryl diazonium specie is an aniline derivative and the aryl diazonium specie is generated with a nitrite.
68. (Currently Amended) A solution of single-wall carbon nanotubes made by the process comprising of:
  - (a) providing a plurality of derivatized single-wall carbon nanotubes, wherein: ~~the plurality of derivatized carbon nanotubes were derivatized utilizing an~~ aryl diazonium specie;  
~~wherein derivatization comprises reaction at the carbon nanotube sidewalls at non-defect sites; and~~
    - (i) an aryl diazonium specie derivatized the plurality of single-wall carbon nanotubes with an aryl moiety bonded to the carbon nanotube surface carbon atoms; and

(ii) there is at least about one aryl moiety to forty carbon atoms on the carbon nanotube surface; and

(b) mixing the plurality of derivatized single-wall carbon nanotubes in a solvent, wherein the derivatized plurality of carbon nanotubes are dispersed in the solvent.

69 – 87. (Cancelled)

88. (Currently Amended) A product made by the process comprising:

(a) preparing an assembly, wherein

(i) the assembly comprises a first plurality of carbon nanotubes and a second plurality of carbon nanotubes; and

(ii) wherein the carbon nanotubes in the first plurality and the carbon nanotubes in the second plurality can be individually addressed electronically;

(b) immersing the assembly in an aryl diazonium specie; ~~and~~

(c) applying a negative potential to the assembly to cause the first plurality to essentially come in contact with the second plurality; and

(d) electrochemically reacting the assembly with the aryl diazonium specie, wherein electrochemically reacting comprises bonding an aryl moiety to the surface of the carbon nanotubes comprising the assembly at the cross points of the first plurality and the second plurality~~so as to foster a side-wall reaction for the plurality of carbon nanotubes.~~

89. (Currently Amended) A product made by the process comprising:

(a) preparing an assembly of carbon nanotubes, wherein

(i) the assembly comprises a first plurality of carbon nanotubes and a second plurality of carbon nanotubes; and

(ii) wherein the carbon nanotubes in the first plurality and the carbon nanotubes in the second plurality can be individually addressed electronically;

(b) immersing the assembly in a first aryl diazonium specie;

(c) applying a potential to the assembly in a first direction to cause the first plurality to essentially come in contact with the second plurality;

- (d) electrochemically reacting the assembly with the first aryl diazonium specie, wherein electrochemically reacting comprises bonding a first aryl moiety to the surface of the carbon nanotubes comprising the assembly at the cross points of the first plurality and the second plurality so as to foster a side wall reaction with the assembly;
  - (e) immersing the assembly in a second aryl diazonium specie;
  - (f) applying a potential to the assembly in a second direction to cause the second plurality to essentially come in contact with the first plurality; and
  - (g) electrochemically reacting the assembly with the second aryl diazonium specie, wherein electrochemically reacting comprises bonding a second aryl moiety to the surface of the carbon nanotubes comprising the assembly at the cross points of the first plurality and the second plurality.
90. (Previously Presented) The product of claim 88, wherein the carbon nanotubes of the first plurality comprise single-wall carbon nanotubes and the carbon nanotubes of the second plurality comprise single-wall carbon nanotubes.
91. (Previously Presented) The product of claim 88, wherein the assembly is a crossbar architecture of carbon nanotubes.
92. (Previously Presented) The product of claim 88, wherein the preparation of the assembly comprises fluid flow over a patterned surface.
93. (Previously Presented) The product of claim 88, wherein the preparation of the assembly comprises direct carbon nanotube growth between posts.
- 94 – 129. (Cancelled)
130. (Cancelled)
131. (Currently Amended) The product of claim 36, 38 or 68, wherein the product is further comprised by a number from about 1 in 20 to about 1 in 40 of the carbon nanotube surface

~~carbon atoms derivatized with an aryl moiety of derivatized carbon atoms in the derivatized carbon nanotubes ranges from about 1 in 20 to about 1 in 40.~~

132. (New) The product of claim 63, wherein removing further comprises heating from about 50°C to about 600°C.
133. (New) The product of claim 63, wherein removing further comprises heating from about 150°C to about 450°C.
134. (New) The product of claim 63, wherein removing further comprises heating to at most about 400°C.
135. (New) The product of claim 63, wherein removing further comprises heating to at most about 350°C.
136. (New) The product of claim 63, wherein removing further comprises heating to at most about 300°C.
137. (New) The product of claim 63, wherein removing further comprises heating to at most about 250°C.
138. (New) The product of claim 63, wherein removing further comprises heating to at most about 200°C.